**Progression in Science at Welwyn St Mary's Primary School**

# *Materials*

| | Expectations | Key words |
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| EYFS | • make observations of common objects<br>• make very simplistic observations of materials<br>• arrange materials into groups<br>• identify when changes occur e.g. when food is cooked | |
| Y1 Everyday Materials | • name some common materials<br>• name some common objects around the school and home<br>• **distinguish between an object and the material from which it is made**<br>• *name materials which have lots of different uses (e.g. paper- wrapping paper, tissue paper, writing paper, birthday card)*<br>• identify some naturally occurring materials: wood, rock, water<br>• identify some man-made materials: glass, metal, plastic<br>• **identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock**<br>• *describe objects that are made from lots of different materials*<br>• *names objects that are sometimes made from different materials (e.g. spoons- plastic, wooden, metal)*<br>• make observations of common objects and the different materials they are made of<br>• communicate these observations using descriptive words (e.g. *bendy, rough, hard)*<br>• identify some properties of materials (e.g. see through, waterproof, absorbent) | Hard, stiff, rough, not bendy, opaque, strong, soft, shiny, smooth, waterproof, stretchy, material, transparent, dull, bendy, absorbent, wood, plastic, glass, magnetic, elastic, fabric, metal, water, rock, |

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| | • **describe the simple physical properties of a variety of everyday materials**<br>• *make predictions about which materials will float and sink*<br>• **compare and group together a variety of everyday materials on the basis of their simple physical properties** (both visible and non-visible)<br>• *explain why people started using plastic bags rather than paper bags* | |
| Y2<br>Use of Everyday Materials | • identify uses of some common materials<br>• give a reason why a material is suitable for its job<br>• recognise that some materials will have more than one property which increases its suitability for its purpose (e.g. glass is transparent, rigid and weatherproof)<br>• **identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses**<br>• suggest several reasons why a material may or may not be suitable for a particular purpose<br>• *explain why one material may be more suitable for a purpose than another by discussing properties*<br>• *explain why plastics cause problems in the oceans*<br>• *explain the importance of reusing and recycling plastic*<br>• *describe how swimsuits have changed over time and how the fabric is now more suitable*<br>• *describe how scientists have invented new materials (e.g. Macintosh, Dunlop)*<br>• identify materials that can be easily changed with force<br>• identify materials that cannot be | Brick, cardboard, transparent, waterproof, insulate, keep warm, hard, rigid, strong, flexible, squash, stretch, twist, bend |

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| | easily changed with force<br>• describe pushes and pulls needed to change a material as big or small<br>• **find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching**<br>• describe changes in shapes as a result of the action of pushes, pulls and twists<br>• *explain why some materials change shape when a force acts (i.e. push, pull, twist, stretch) as a result of their properties* | |
| Y3 Rocks, Fossils and Soil | • observe the characteristics of a variety of rocks<br>• name and describe the characteristics of several rocks<br>• identify fossils in rocks<br>• classify rocks from the evidence of investigations<br>• explain that rocks are used for different purposes dependent on their physical properties<br>• explain that different types of rock react differently to physical forces (e.g. water, rubbing)<br>• **compare and group together different kinds of rocks on the basis of their appearance and simple physical properties**<br>• understand that there are rocks under the Earths' surface<br>• *relate the simple physical properties of some rocks to their formation*<br>• *explain why certain rocks are used for different purposes and why some rocks could be used for these jobs for example:*<br>▪ *Marble- kitchen worktops or statues*<br>▪ *Slate roof tiles*<br>▪ *Granite walls* | Rock, soil, marble, granite, sand, stone, slate, chalk, clay, texture, absorbed, permeable, pebble, characteristic, surface, organic, impermeable, crystal, grains, crumbly, igneous, sedimentary, metamorphic, fossil, |

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| | • *explain how a model (e.g. biscuits, chocolate bars) can be used to represent sedimentary, metamorphic and igneous rocks*<br>• *explain why we might find lots of the same types of rock in one place*<br>• **describe in simple terms how fossils are formed when things that have lived are trapped within rock**<br>• *describe how Mary Anning discovered fossils*<br>• *explain why we do not see the soft parts of animals in fossils*<br>• recognise that soil is a mixture of different materials and living things<br>• recognise that soil contains dead plants and animals<br>• recognise that there is rock under all surfaces and that soils come from rocks<br>• **recognise that soils are made from rocks and organic matter** | |
| Y4 Solids, Liquids and Gases | • name some solids and liquids<br>• state that air is a gas<br>• state some differences between solids, liquids and gases<br>• recognise everyday substances as mixtures of solids, liquids and/or gases<br>• recognise that air is a material and that it is one of a range of gases which have important uses<br>• recognise that gases flow from place to place<br>• know that gases can be easily compressed<br>• describe the differences between solids and liquids<br>• *describe the behaviour and properties of gases*<br>• compares simple solids and liquids (e.g. in terms of ease of squashing or pouring) | Water, air, ice, milk, lemonade, juice, metal, solid, liquid, gas, pour, flow, change shape, squash, heat, cool, grain/granular, temperature, thermometer, freeze, melt, boil, evaporate, condense, steam, smoke, sea water, properties, melting point, degrees Celsius, |

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| | • **compare and group materials together, according to whether they are solids, liquids or gases**<br>• *make clear distinctions between the properties of solids, liquids and gases*<br>• *explain why granular solids have some of the properties associated with liquids*<br>• *explain why some substances are hard to classify as solids, liquids and gases (e.g. whipped cream, mousse, mayonnaise, muddy water, fizzy drinks, cornflour and water)*<br>• observe what happens to a variety of materials when they are heated (e.g. chocolate, ice cream, butter, water)<br>• identify a wide range of contexts in which changes of state take place describe a few examples where these changes occur<br>• recognise that for a substance to be detected by smell, some of it must be in the gas state<br>• **observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)**<br>• *compare the boiling point of different liquids*<br>• state that ice, water and steam are the same material<br>• identify the processes of melting, freezing, evaporation and condensation<br>• describe what happens to water when it is heated and cooled<br>• recognise that these processes can be reversed<br>• describe how when ice melts it turns to liquid and how when water freezes it becomes ice<br>• describe how these processes can be reversed<br>• describe how liquids evaporate to form gases and how gases condense to form | |

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| | liquids<br>• sequence the changes that happen in the water cycle<br>• describe the water cycle in terms of these processes<br>• explain the relationship between liquids and solids in terms of melting and freezing<br>• explain the relationship between liquids and gases in terms of evaporation and condensation<br>• **identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature**<br>• know that temperature can affect the rate of evaporation or condensation<br>• describe the effect of temperature on evaporation<br>• explain how changing conditions affects processes such as evaporation and condensation<br>• identify a range of contexts in which changes take place (e.g. evaporation of puddles in the school playground or from clothes on a washing line, condensation in the bathroom)<br>• *explore the effect of salt on ice*<br>• *explain why salt is put on the roads in winter* | |
| Y5 Changes of Materials | • observe and explore the properties of materials (e.g. hardness, transparency, magnetism, electrical and thermal conductivity)<br>• identify some materials that are good thermal insulators and some everyday uses of these<br>• recognise that metals are both good thermal and good electrical conductors<br>• suggest why particular materials are used for different jobs depending on their properties | Hardness, solubility, transparency, conductivity, thermal, insulation, dissolve, solution, separation, polymers, reversible, irreversible, evaporating, melting, evaporation, filtering, sieving, , dissolving, burning, rusting, vinegar, bicarbonate of soda, magnetism, insulators, |

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| | • **compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets**<br>• **give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic**<br>• *describe the properties of new materials (e.g. aerogel, silly putty, wrinkle-free cotton)*<br>• *explain why some materials are good thermal insulators*<br>• recognise that salt or sugar dissolves in water but sand won't<br>• name some materials that will and some that will not dissolve in water<br>• recognise that although it is not possible to see a dissolved solid, it remains in the solution<br>• describe melting and dissolving and give everyday examples of each<br>• *describe the difference between melting and dissolving*<br>• identify and explore factors that affect the rate at which a solid dissolves<br>• recognise that an undissolved solid can be separated from a liquid by filtering<br>• recognise that a solid can be recovered from a solution by evaporation<br>• describe the properties of mixtures which can be separated by filtration<br>• describe some methods that are used to separate simple mixtures<br>• explain that when solids dissolve they break up so small they can pass through the holes in the filter paper<br>• **know that some materials will dissolve in liquid to form a solution,** | conductors, soluble, insoluble |

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| | **and describe how to recover a substance from a solution**<br>• use knowledge about how a specific mixture can be separated to suggest ways in which other similar mixtures might be separated<br>• **use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating**<br>• *recognise that inks and dyes are often mixtures of different colours and these can be separated by chromatography*<br>• *explain why ink or dye moves up the paper in chromatography*<br>• recognise that dissolving is a reversible change<br>• recognise that some changes can be reversed and some cannot<br>• recognise that changes of state are reversible<br>• **demonstrate that dissolving, mixing and changes of state are reversible changes**<br>• observe and explore a variety of chemical changes (e.g. burning)<br>• identify whether some changes are reversible or not<br>• recognise dissolving as reversible<br>• classify some changes as reversible (*e.g. dissolving)* and others as irreversible (*e.g. burning*)<br>• recognise that irreversible changes often make new and useful materials<br>• recognise the hazards of burning materials<br>• describe what happens when acid and bicarbonate of soda are mixed<br>• **explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda**<br>• explain that in some cases the new | |

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| | materials made are gases and identify some evidence for the production of gases (e.g. vigorous bubbling) | |